

2019—2020

2020.1

100

90

1 8 1 4 I 5 8

2

H 1 16 C 64

I

42

(

18

1 12

2

13 18

3

42)

1

A

B

C

D

2

A H_2

B $H_3 H_2$

C $H_4 H_3$

D $B C H_3$

3

A $HC H_3$ $HC H_3$ $H C H_3$

B $H_2 H_3 \rightleftharpoons H H_3$

C $F (H)_3$ $F (H)_3$ $F^{3+} H_3$

D $H_2 H_2 \rightleftharpoons 2H H_2$

4

0.1 $CH_3C H$

H^+

A

B

C

H

D

5

A

B

C^{2+}

C

$C H_2 C^{2+}$

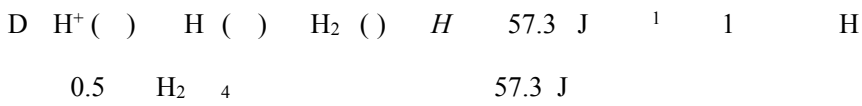
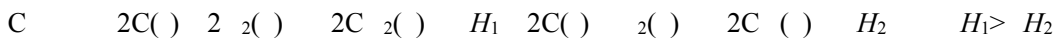
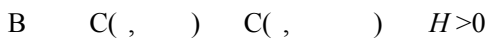
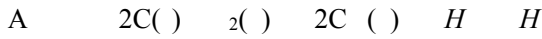
D

$C^{2+} H_2 C$

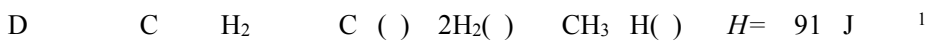
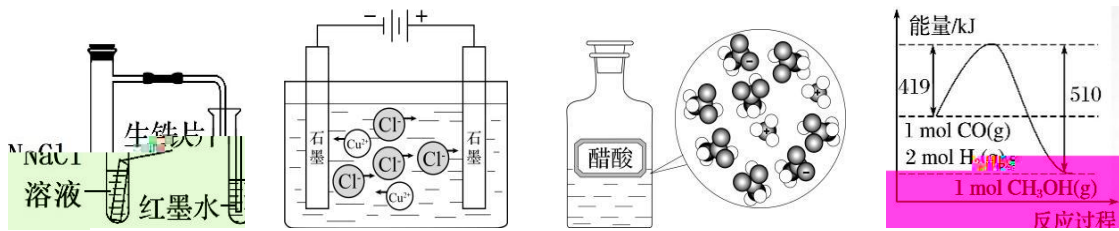
6

A B C D

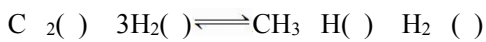
7.



8



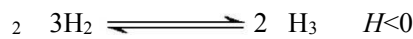
9



C

D

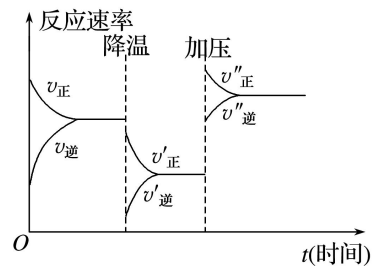
10.



A B C D

11. A $2B \rightleftharpoons 2C + 3D$

A B D
C D A B C D



12. F $_4$

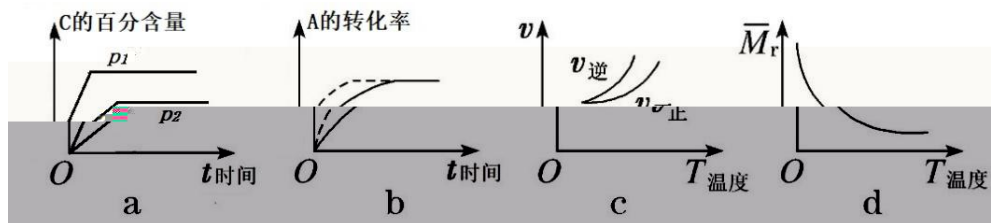
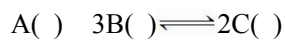


A
B
C
D

13.

A	2	A $_3$ A C	$K(A C) K(A_2)$		
B	2 3	H			
C	H				
D					

14



A $p_1 > p_2$
B
C
D

15 $\text{H}_2 + \text{C}_2 \rightleftharpoons \text{C}(\text{H}) + \text{H}_2$ 610
 0.40 H_2 0.10 C_2 1 10
 0.02

- A $K = \frac{c(\text{C}(\text{H})) c(\text{H}_2)}{c(\text{H}_2) c(\text{C}_2)}$
 B 10 $v(\text{H}_2) = 0.001$ 1 1
 C 620 0.03 $H < 0$
 D 610 H_2 $\alpha = 2.5\%$

16 25 H_2 H_2 H_2

- A 100 H_2 4
 B
 C V_1 V_2 H_2 3 V_1 V_2 11 9
 D H_2 7

17 $K(\text{A} + \text{C}) = 1.78 \times 10^{10}$ $K(\text{A} + 2\text{C} \rightleftharpoons \text{C}_2) = 2.00 \times 10^{12}$ $\text{C} + 2\text{C} \rightleftharpoons \text{C}_3$
 0.0010 / $\text{A} + 3\text{C} \rightleftharpoons \text{A}_3\text{C}_4$ $\text{C} + 3\text{C} \rightleftharpoons \text{C}_4$
 5.000 $\times 10^3$ / C

- A 8.90×10^6 / B 1.36×10^5 /
 C 1×10^5 / D 4.45×10^2 /

18 25 H_2 H_2 H_2 $n(\text{H}_2) = n(\text{H}_3)$

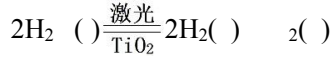
$n(\text{H}_2)$ $n(\text{H}_3)$	91 9	1 1	9 91
H_2	8.2	7.2	6.2

()

- A H_2 $c(\text{H}_2) < c(\text{H}_3)$
 B H_2 $c(\text{H}_2) = c(\text{H}_3)$ $c(\text{H}_2) = c(\text{H}_3)$ $c(\text{H}_2) = c(\text{H}_3)$
 C $n(\text{H}_2) = n(\text{H}_3) = 1$ $c(\text{H}_2) = c(\text{H}_3)$ $c(\text{H}_2) = c(\text{H}_3)$
 D $c(\text{H}_2) = c(\text{H}_3)$ $c(\text{H}_2) = c(\text{H}_3)$

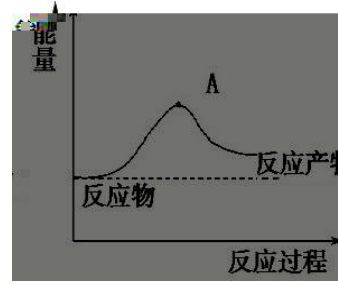
6 58

19. 7 1

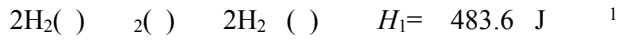


2 A

" " "



2



	H ₂	H ₂	H ₂
E / (kJ mol ⁻¹)		498	465

$$= \text{kJ mol}^{-1}$$

$$H = \text{kJ mol}^{-1}$$

3 1 C(,)

C H₂

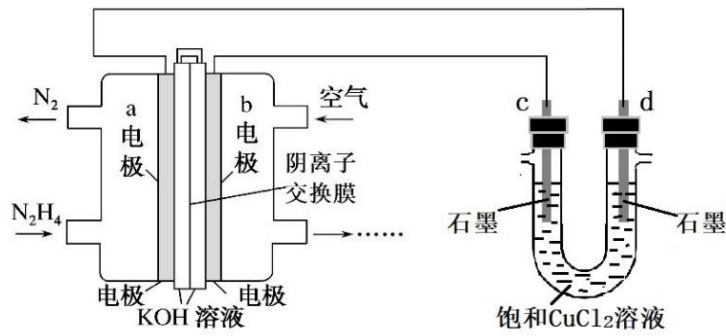
10.94 J

20. 7

2H₄

H

C C₂



1

" " " "

2

" " " "

3

0.15 2

4

H

" " " "

5

21. 12

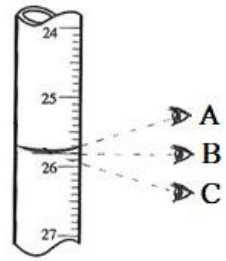
1 25.00 1.00 ¹ 250 ()
25.00

2 0.1 /



3 " " " "

(" A" " B" " C")



4

5 :

	/			V/
		V ₁ /	V ₂ /	
1	25.00	1.00	19.60	
2	25.00	19.60	34.20	
3	25.00	0.50	14.90	

V _____

%

6

" " " " " "

22 10

2 x

2() 2()

2 2() 2() \rightleftharpoons 2 3()

2

	/	1	1	1	2
	$n(2)/$	0.20	0.40	0.40	0.20
	$n(2)/$	0.12	0.12	0.24	0.12
2	%	80	1	2	3

1 K _____

2 2 1 _____ 2 " >" " <" " ="

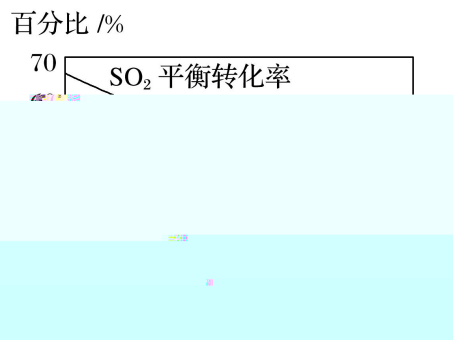
3 3 $c_1 c_2 c_1 \underline{\quad} 2c_2$ " >" " <"

" ="

2 1 2 4 C 2()

2C () \rightleftharpoons 2C 2() () H 2

4 $H \underline{\quad} 0$ " >" " <"
 K() K()
 5 K=
 6 250



23. 12

1 25 F C 3 H 7 " >" " <" " ="

_____ F C 3 _____

2

	$c(\text{F C}_3)/$	$V(\text{F C}_3)/$	/	H
1	0.1	5	25	x
2	0.1	5	35	y
3	0.2	5	25	z

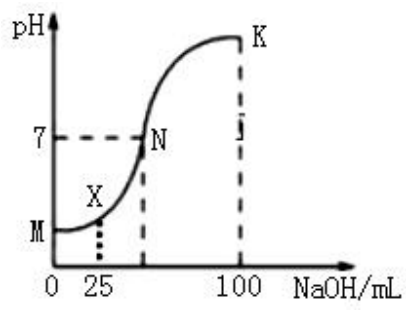
- A
- B $x > y > z$
- C

HA $K = 4.0 \times 10^{-7}$ 298

25 100 0.1 ^1HA

0.2 ^1H ^1H ^1H

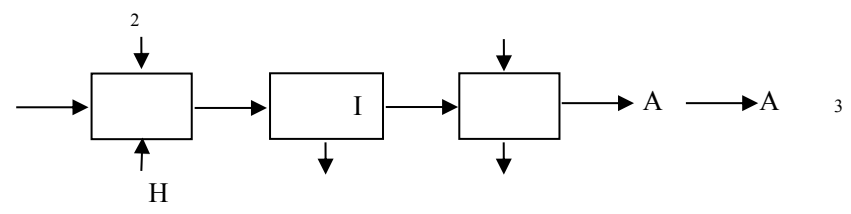
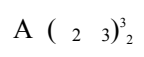
3 25 0.1 ^1HA



$c(\text{H}^+) = \frac{c(\text{H}^+)c(\text{A}^-)}{K}$

$c(\text{H}^+) = \frac{c(\text{H}^+)c(\text{A}^-)}{K}$

24. 10



- $\text{A}(\text{OH})_3$ $K = 2.0 \times 10^{-48}$
- 2C_3

1 I _____

2 H H 8 _____

3 $\text{A}(\text{OH})_3$ A^+

$c(\text{A}^+) = 1.0 \times 10^{-5}$ $c(\text{H}^+) = \frac{c(\text{A}^+)c(\text{H}^+)}{K}$

4 2C_3 $\text{A}(\text{OH})_3$ _____ " "

" "

5 A H $\text{A}(\text{OH})_3$ $\text{A}(\text{OH})_3$ H $\text{A}(\text{OH})_3$

A _____

6 _____